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ABSTRACT

A study of S. R. Ranganathan's theory of reference service is undertaken by using an historical methodology. It was evident from the literature review that Ranganathan had established that reference service was the most important work and served as the hub of all library practices. There were six factors that were repeatedly considered by Ranganathan to form the theoretical base upon which the practical reference service was built: (1) Ranganathan's colon classification system; (2) classified catalog; (3) the five laws of library science; (4) Ranganathan's own experience with actual reference work; (5) Ranganathan's references to Indian classical literature; and (6) the principle of humanistic reference service. The study also evaluated the effectiveness of Ranganathan's theories and concepts of reference service in the context of mechanized retrieval of information. Among the factors, Ranganathan emphasized the use of the colon classification scheme as an effective tool for reference service. This classification scheme is based in the way the mind of the patron perceives and expresses his need for information. The classification scheme presents the structure of subjects in the recorded document and its relationships among other categories of subjects. The tool will also aid in determining the precise needs of the patron or the subjects of documents. Definitions of terms and phrases are appended. (Contains 21 references.) (Author/ALF)

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S.R. RANGANATHAN'S THEORY OF REFERENCE SERVICE

A Master's Research Paper submitted to the
Kent State University School of Library Science
in partial fulfillment of the requirements
for the degree Master of Library Science

by
Manoj M. Varghese

May, 1991

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ABSTRACT

A study of S.R. Ranganathan's theory of reference service is undertaken by using an historical methodology. It was evident from the literature review that Ranganathan had established that reference service was the most important work and served as the hub of all library practices. There were six factors that were repeatedly considered by Ranganathan to form the theoretical base upon which the practical reference service was built: (1) Ranganathan's colon classification system, (2) Classified catalog, (3) the five laws of library science, (4) Ranganathan's own experience with actual reference work, (5) Ranganathan's references to Indian Classical Literature and (6) the principle of humanistic reference service. The study also evaluated the effectiveness of Ranganathan's theories and concepts of reference service in the context of mechanized retrieval of information.

Among the factors Ranganathan emphasized the use of the colon classification scheme as an effective tool for reference service. Ranganathan's classification scheme is based in the way the mind of the patron perceives and expresses his need for information. The classification scheme presents the structure of subjects in the recorded document and its relationships among other categories of subjects. The tool will also aid in determining the precise needs of the patron or the subjects of documents.

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M.L.S., Kent State University, 1992

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Statement of the Study

Although S.R. Ranganathan's contribution to the development of all areas in library science has been repeatedly examined, it is quite apparent that there are gaps in the studies about his work. With regard to one gap, the undertaking of a historical study of Ranganathan's theory of reference service could be of immense value. In examining his writings it becomes clear that the intended objectives of his work were to develop a strong theoretical base for reference service, with intense practical implications, and further to establish that reference service is the most important dimension of librarianship. However, his critics have seen his theory to reference service quite differently, dismissing it as naive, too philosophical and having few practical applications. This study will attempt to examine objectively his theory of reference service.

Objectives

1. To study and interpret the various concepts used by Ranganathan in the development of his theory of reference service.

2. To determine any theoretical base upon which the practical aspects of reference service could be built.

3. Finally, to determine whether his theory of reference service is the essence of librarianship and to see its importance within the context of today's services.

Methodology

A study of S.R. Ranganathan's theory of reference service will be conducted by using an historical methodology. It will involve four stages;

In the first stage, a short biographical sketch of S.R. Ranganathan will be provided. Although it is not the core of this study, it will aid scholars who are not familiar with his contributions to library science.

In the second stage, direct examination will be undertaken of all the primary documents on the theory of reference service. Each of them will be examined to see whether and how it supports the objectives of the study.

In the third stage, all secondary materials with emphasis on reviews and journal articles on the theory of reference service will be examined to find out the various interpretations that his critics and supporters have to offer.

In the fourth stage, an interpretation supported on the synthesis of the second and third stages will be presented on his theory of reference service as viewed with the changing concept of libraries and functions of libraries.

Literature review and analysis

The literature review involved searching the print, and on-disc versions of Library Literature from 1940 to date, Library and Information Science Abstracts from 1950 to date and Information Science Abstracts from 1969 to date using 'Ranganathan' as author and subject. A number of important and relevant studies were retrieved. However, there were no dissertations to date in the online version of Dissertation Abstracts Online and that were appropriate to this study.

First stage of study :

Biographical sketch and contributions of S.R. Ranganathan to library science

Ranganathan began his career as a teacher who taught physics and mathematics at the college level. He never wished to become a librarian or to enter library science. However, he described it as his destiny to become one. It was not until he was sent to England in 1924 for nine months of study-cum-observation in various libraries and his encounter with W.C. Berwick Sayers, chief librarian of Croydon Public Library and lecturer in the University School of Librarianship, London, that Ranganathan began to develop the interest and the insight to see the library science movement as a necessary social force for improving society.[1]

After his return from England, for most of his life,

Ranganathan stayed on in India to contribute to and to develop library science. The first step Ranganathan took was to establish a foundation from which all the library practices could be derived. This work came to be known as The Five Laws of Library Science. The parameters stated in these five laws could be altered or changed, if the situation demanded it.[2]

With the publication of Ranganathan's five laws, it became easier to derive and develop library practices in such areas as library management, classification and cataloging, selection and acquisitions for books and serials, and reference service. There were unique situations and environments that inspired Ranganathan to think about certain library practices and to write about them.[3]

Ranganathan's desire was to develop a theory for a classification system that would be flexible enough to incorporate new subjects at any point of time. The classification scheme came to be known as the Colon Classification System. The theory of this system has been refined numerous times, leading to a 7th edition of the scheme. When Ranganathan was appointed as rapporteur general of the International Federation for Documentation/Committee on Classification Research, he was led to publish many research reports on classification.[4]

Ranganathan also developed a comprehensive catalog code for the classified catalog. He established the principles of cataloging and a chain indexing procedure for deriving subject heading entries. His chain procedure was applied in the production

of the British National Bibliography.[5] He continued to explore unique theories and principles for book and serial selections, and according to D.W. Langridge, "The vast majority of the principles are as valid for the most highly developed Western countries as they are for India."[6]

He further streamlined the processes involved in library administration and management. He designed forms and registers to make acquisition easier and also forms for a three card charging system. He also developed a formula for the required man power planning and the staff to carry out library work. His analyses and contribution also covered areas of budgeting, personnel management, job analysis, time and motion study, and "librametry."[7]

Observing reference service as one of the implications emerging from the five laws, Ranganathan developed a theory for it derived in part from his experiences with ready and long - range reference service. However, besides establishing the five laws as the foundation of all library work, his concern was to find out which one of the library services was central. He also developed strategies for librarians to interview users and also initiated the APUPA (alien, penumbral, umbral, penumbral, alien) pattern of shelf arrangement for easy browsing.[8]

One of his activities, was to draft library bills so that the concept of the public library system was accepted by various States of India. He was responsible for the enactment of library legislation in most of the States in India. At the same time, his

concern for the type of library buildings and furniture led him to develop theory and practice for them.[9]

Ranganathan placed special emphasis on research in different areas of library science. In this regard, he founded the Documentation Research Training Center which trained librarians to serve the needs of the research and development sections of various special centers and libraries. He was also involved in setting up of the Indian National Scientific Documentation Center, which provided information for research and development personnel. In order to stimulate discussion and publication of topics of research interest in library science, he brought out the publication, Library Science with a Slant to Documentation.[10]

He also saw the need to formulate high standards for the professional education of the librarians in India. He started diploma and degree courses in library science. He set down procedures for guidelines for establishing standards for library education and a pattern for courses in library science in the universities. Many of his associates and students considered him as a "born teacher." He was keen to see a considerable amount of research done in teaching techniques of library science. This was because Ranganathan believed that library science was best understood in a practical context. Several of his teaching experiences are published as case studies and incorporated in his papers.[11]

In the last years of his life, Ranganathan abstained from all

travelling and tried to maintain his solitude, but soon librarians and organizations sought his guidance and expertise in the field. It was one of these settings that he conceived the concept of Absolute Syntax for indexing language, which he presented in a taped lecture at a symposium at the University of Maryland in 1966. He was aware of the changing situations in library science, which made him spent time to revise most of his writings to incorporate the changed situations. He contributed number of working papers and articles to both Indian and foreign publications. Several of his monographs,like Physical Bibliography for Librarians, Cataloging Practices, were published posthumously.[12]

Ranganathan's earnings as a National professor of library science and the royalties from his publications were set aside for the establishment of S.R.Ranganathan chair in library science at the University of Madras and the S.R. Ranganathan Endowment for library science. The objective was to provide an impetus for continuous research in the field of library science.[13]

Second stage of study

In examining his monographs to see whether and how they support the objectives of this study, Ranganathan in his monograph Reference Service first defines reference service as "personal service to each reader in helping him to find the documents, answering his interest at the moment, pin-pointedly, exhaustively and expeditiously."[14] Personal service, according to Ranganathan

is getting to know the reader's interest from the time the reader asks the question to the last moment of delivering his documents.[15]

Ranganathan discusses the laws of library science and his interpretation which form the groundwork for the reference service. The first law states, 'Books are for use.' In order to put the book to its maximum use, according to Ranganathan, it is best to employ reference service to help the readers to help themselves. The second law states, 'Every reader his book.' According to Ranganathan, reference service is required to aid the reader to get along with the document search.[16]

The third law states, 'Every book its reader.' To Ranganathan, the book cannot travel to the reader on its own, but will require reference service to interpret the collection to the potential user or match the reader's query with the document. The fourth law states, 'Save the time of the reader.' For the very first time, the element of time is introduced. According to Ranganathan, reference service comes to the aid of the researcher and scientist whose time cannot be wasted.[17]

The fifth law states, 'Library is a growing organism.' According to Ranganathan, the collection, the readers, and the with time increase to meet altered situations; the kind of reference service will have to be altered to take advantage of technological advances. Ranganathan also suggests a library system where resources are shared.[18]

In an another section of the same monograph, Ranganathan

discusses the variety of readers who have difficulties reading the catalog, locating alternate sources of information, and interpreting the sources correctly. The users might encounter specific problems, where the contents may differ from the title of the source, where the title of the document varies in different countries, etc. In all these situations, Ranganathan calls for reference service to come to the aid of the users to solve their difficulties.[19]

Next Ranganthan discusses one of the types of reference service known as ready reference service. He defines it as a fact finding service. In other words, to give information on demand or in anticipation, and the element of time is most important in carrying out ready reference service.[20]

One need to provide ready reference service, according to Ranganathan, is to aid the users in finding out whether the contents of the information source are arranged alphabetically or classified by subjects and to identify the use of access words and cross references in the index.[21]

In the last part of Ranganathan's discussion of ready reference service, he points out the processes in carrying out such a service. It involves prepartion, service and assimilation. Preparation requires the reference librarian to familiarize himself with all the information sources needed to carry out ready reference service. Service in ready reference service involves understanding the question or the exact context of the user and to

find out the background and the capacity of the enquirer and to direct him to the source. In the process of assimilation, Ranganathan mentions that no matter how well one knows about the location of all information by formal study, it is only when one comes in direct contact with the real situation is one stimulated to recall everything one has assimilated.[22]

The next type Ranganathan discusses is the long-range reference service. The dividing line between ready reference and long-range reference service is elusive. However there are three factors to be noted in long-range reference service. They are: the concept of time, the type of materials used, and the nature of information sought.[23]

Ranganthan discusses the need of long-range reference service and its importance. Because of the time restraint in business and research organizations, Ranganathan suggests that the research staff and management of the organization share the problem so that long-range reference service could take care of their information needs and increase their time for effective research. Further, with the increased number of publications in every field of study and in several formats, long-range reference service will lead the researcher to the appropriate document by the use of the classificatiory system and classified catalog, various indexing and abstracting tools. The service may also need to explain the contents of the documents.[24]

The interdisciplinary nature of different subjects and their representation in varied information sources makes it necessary for long-range reference service to identify the arrangement and to determine the access word and cross references in these sources. Further, especially in the sciences, there are linguistic barriers to overcome, and Ranganathan recommends a translation service to serve as one of the aspects of long-range reference service.[25]

In the last section, Ranganathan discusses the steps involved in carrying out long-range reference service. It involves preparation, and service and assimilation. In the preparation stage, one must familiarize himself with different kinds of bibliographical sources in specific and in allied fields. It may also involve keeping in close contact with information specialists, scientists in the field of specialization and documentation centers both at the national and at the international level. This stage of preparation will extend long-range reference service beyond one's own library.[26]

Service in long-range reference service involves in analyzing the specialist's query based on facet analysis. According to Ranganathan, facet analysis will help one to decide the class number and further identifies information in various sources that may be outside one's own library or needs translation or photocopying services. The final step in this stage involves in the supplying of the actual documents.[27]

Assimilation in long-range service takes place only when one experiences it in an actual situation. That kind of experience

cannot be gained by any amount of reading or hearing about long-range reference service. According to Ranganathan, by this repeated experience one can come to a deeper understanding of various information sources.[28]

In another monograph publication entitled: Reference Service and Reference Material, Ranganathan presents a paper entitled, "Genesis and present position of reference service and reference material."[29] In this paper, Ranganathan discusses the changing role of the library from preservation stage to a stage of an efficient communication. This shift occurred after the industrial revolution, when there was an imbalance between the population demand and supply of various commodities and services; this imbalance resulted in intense research in research centers. Further, the nature of research, too, had changed from individual to team research.[30]

In order to provide relevant information services to the research team, Ranganathan considered two elements. They are: reference service and the access to reference material. Ranganathan further asserts that it should be library science that must develop these two elements. He also considers it appropriate to have librarians as part of the research team. He cautions the librarian to gauge the levels, the background, and the need of the researcher for long-range service.[31]

In another monograph entitled The Five Laws of Library Science, Ranganathan discusses the theoretical base from which

reference services emerge. In other words, reference service is seen as one of the derivations arising from the third, fourth, and fifth laws of library science. According to the third law, which states "Every book its reader," libraries are mandatory centers of activity and use. The root of this is to have open access systems with classified arrangement of the collections.

In order to access the collection, Ranganathan mentions that no matter how well the library collection is classified and analyzed, it cannot substitute for a need for reference service to assist the users to access information. The third law also demands that in order to carry out effective reference service intensively, one must know the information needs of the population being served. There is no alternative than to come in direct contact with the readers to know their needs.[32]

The fourth law states, "Save the time of the reader." The concept of time is considered important and according to Ranganathan there are many tools constructed to access information in the least possible time. However, with all these tools, it still presents difficulties for the readers using them. Ranganathan sees the reference service coming to the aid of the reader.[33]

The fifth law states "library is a growing organism." According to Ranganathan, the library has all the potential of a growing organism and the parts that are capable of growth are in the areas of collection, readers and the staff. According to Ranganathan, just to possess large volumes in the collection and to

have increased numbers of readers does not constitute a library. What constitutes one is when the staff provides reference service to generalists or to a specialist reader which will bring about the contact between the right book and the right reader.[34]

In the working paper, Reference service: The Hub and Foundation of library Work, Ranganathan asks: what must serve as the hub and foundation of library work? After examining the theoretical and the practical aspects of each of the library activities, Ranganathan found practices in reference service to serve as the core of library work.[35]

However, Ranganathan dismisses the theory of reference service to serve as the hub and foundation of library work because it only brings about the contact between the right book and the right reader and further describes the different kinds of users. Later, after what Ranganathan heard from a lecture on the concept of 'divine curiosity,' he was stimulated to further examine the potential of practical reference service.[36]

As we have seen, practical reference service involves two kinds, ready reference and long-range reference service. Ranganathan dismisses ready reference service as the basis of library work, because it answers directory type of questions in the least possible time. Long-range reference service involves the use of a wider range of documents to search to provide information. This service will help the subject specialist pursue his subject of interest in depth.[37]

In conclusion, Ranganathan points out that long-range reference service will assess the library collections and the usefulness of the various information access tools so that all other library functions will work, study, and review their own activities on the basis of this assessment. Further, Ranganathan recommends a practical or a clinical education, which involves five stages for effective long-range reference service. They are: shelf list study, using the catalog, observing how long range reference service is carried out, practicing long-range reference service oneself, and getting an appraisal of one's performance afterwards."

In discussing the article titled, "Evolution of Reference Service and Documentation Service," Ranganathan pushes for finding a fuller and a deeper definition of reference service than one has in the English language. He chose a Sanskrit word "Anulaya Seva" to mean, "Harmonious Integration Service" and according to him, this is a deeper meaning for reference service."

Next he highlights different time periods, starting from the second half of the 19th century, when the first Library Act was passed in England, to the latter half of the 20th century. He then considers two main parameters, literacy and document, and evaluates them against the time periods considered. This enables one to find out whether there was any demand for reference service at all. The parameter 'literacy' determines the extent to which reading public is available. It includes the number of people who are literate

and the specialists or scholars during the period. The parameter 'document' determines the number of scholarly works for specialist readers and general works for generalist readers. Further it also determines the number of journal articles available.

Ranganathan was able to conclude that there was no need of reference service in the 19th century because there were fewer books published and most of the scholars were able to serve themselves. However, in the first half of the 20th century, when education became universal and the number of readers and books published increased, there was a demand for reference service. Bythe second half of the 20th century, there was a substantial increase in the number of journal articles published and increased number of subject specialists. Reference service was then concentrated on the needs of the subject specialists. This shift led to the emergence of the concept of "Documentation Service."[40]

In the monograph titled: Documentation, Ranganathan defines it as a "service with emphasis on nascent micro documents and on specialist readers".[41] This kind of service is most valued, according to Ranganathan, in all research institutions. The service is termed as Documentation Service.[42]

He was further faced with the dilemma of unifying all the library work to a central point called the hub. This hub he considered to be none other than the documentation service. All the other activities are considered as spokes of the wheel which are interconnected themselves and converge to the hub. Ranganathan

considers documentation service as the hub because it aids in the selection and acquisitions of materials, it evaluates the usefulness of the classification system adopted, and also helps to promote developmental research in classification. It further identifies the inadequacies of the catalog code system in use and the cross references and the subject entries derived from the system.[43]

In the article titled: "Reference Service through Four Centuries," Ranganathan establishes a theoretical base for the development of reference service from a casual one to ready reference services and, later, to long-range reference service. According to Ranganathan, this was due to the increased number of publications and the increased number of scholars seeking information and the emergence of new subjects, which made it difficult for casual reference service or for a bibliophile to serve the users.[44]

Ranganathan emphasizes that it was long-range reference service that helped reference librarians to understand the information needs and the mental make-up of different readers and the peculiarities associated with searching various information sources. Long-range reference services had to be backed up by an efficient scheme of classification system and a classified catalogue code with emphasis on relevant subject entries and cross references and a large collection of indexes and abstracts.[45]

Further Ranganathan stresses the necessary qualifications of

a specialist librarian to do long-range reference service. He must have a knowledge of the techniques of facet analysis, reader psychology, and the trends of the wave front in the subject area. To provide the necessary training to librarians and documentalists, Ranganathan was involved in the setting up of Documentation Research Training Center in 1962. The primary purpose was to train librarians and documentalists, to develop depth classification schedules of diverse commodities, and to improve upon and design classification techniques for parent organizations and to provide consultation service on documentation to industries and research centers.[46]

In another paper titled, "Reference Service and Humanism", Ranganathan mentions that in order to develop from helpless infancy to self-governing maturity, a life-long education is essential. This transition has stimulated the increase in publications and the enactment of library legislation. According to Ranganathan, no matter how well the collection is classified, catalogued and retrieved, it will present certain amount of difficulty to the users in locating their information needs. Coupled with these techniques, Ranganthan recommends the intervention of the human element which is what reference service is to provide.[47]

Ranganathan asserts that the humanism involved in providing reference services will help interpret the mechanical tools used in providing information access for the user. Most of all, Ranganathan stresses that, to provide reference service, it is

essential to be a friend and talk the language of the user. This kind of humanistic service will make the library profession re-evaluate its search techniques and routines to suit the needs of the users and once again make it re-examine the purpose for which the libraries have come to exist."

Third stage of study

In examining a number of articles by Ranganathan's critics, there were mixed reactions to his theory of reference service. Chappell, in the article titled, "The place of reference service in Ranganathan's theory of librarianship," emphasizes on Ranganathan's classification system as a basis for effective reference service. The classification system allows the librarian to grasp the developing pattern of knowledge represented and the interdisciplinary nature among subjects represented, that are made apparent to the librarian when contact is made with the reader."

Chappell also points out the importance that Ranganathan placed on intuition coupled with the classification system in providing reference service. Though Ranganathan's classification system is constructed to reflect the way the human brain seeks information, Chappell dismisses the classification system that cannot be subjected to an intellectual test. But ultimately, according to Ranganathan, the value of the classification system lies in its helpfulness in matching the right document with the right reader. In the end, Chappell recommends Ranganathan's

approach to reference service to the librarians who are not familiar with it, despite its limitations and the use of an uncommunicable element like intuition. This approach will help to broaden librarians' perspectives for those who are only familiar with the enumerative scheme of classification.[50]

Focke, in her review of Ranganathan's theory of reference service, places little value on the work but emphasizes few of the case studies used by Ranganathan to enlighten the theoretical and the practical aspects of reference service.[51]

Grogan also points out that Ranganathan's theory of reference service was built upon actual experiences of Ranganathan's work with the users. Grogan terms Ranganathan's theory of reference service as still the "most profound study in English of reference work."[52]

Further, Osborn, in another review of Ranganathan's theory of reference service, concludes that the case studies of Ranganathan's experiences with reference work served as one of the bases to his theory of reference service. Above all, he contends that the humanism with which Ranganathan conducts reference service will enhance the value of the library as a social organization.[53]

Hansen at first judges that Ranganathan's work on reference service as dated and says it fits only the times of the author. At the same time, Hansen identifies key factors that formed the basis of Ranganathan's theory of reference service. Hansen places importance on the fourth law of library science which states "Save

the time of the reader." This principle serves as one of the bases from which reference services emerge. Hansen agrees to Ranganathan's practical interpretation of the law that if reference service does not save the time of the reader, then all search techniques developed are useless.[54]

Hansen also recognizes the urgency of understanding the user'sinformation needs in a given situation in order to provide effective reference service. Ranganthan's classification system has the potential to be useful not only in manual searches but also in the online search process.[55]

Coate's assessment of Ranganathan's theory of reference service concludes without any doubt that Ranganathan's colon classification served as one of the bases to effective reference service. Coate elaborated on the usefulness of the classification system. The scheme provides reference service a framework to conduct the search from generic to coordinate subjects, and can be developed with the minimum amount of information about the subject provided by the user. It establishes a pattern with the intellectual materials that are handled constantly. Next, the notation of the classification system, which is a mixed one, incorporates newer subjects and helps in easy location of them.[56]

Coate's examination of the catalog code, used as one of the bases to effective reference service preferred Ranganathan's classified catalogue code to the dictionary code, because the former retraces the classification pattern of the subject by the

use of chain procedure.[57] For instance, the chain procedure for the title, Tuberculosis of lungs was derived as:

L	Medicine
L4	Medicine of Respiratory system
L45	Medicine of lungs
L45:	False link
L45:4	Disease of lungs
L45:42	Infectious disease of lungs
L45:421	Tuberculosis

Chakrabortty assesses the impact of classical literature on Ranganathan's theory of reference service. Ranganathan matured in an environment of Sanskrit classics and its influence was felt in almost all his writings in library science, and reference service was no exception. These classics inspired Ranganathan to develop terms, concepts and situations that would best illustrate how reference service should be carried out.

To provide an instance, Ranganathan considered three factors that make a library: books, readers and the staff. He places empahasis on a deep spiritual foundation that the reference librarian must strive to possess. This foundation will enable the reference librarian to acquire the necessary wisdom to connect the reader with the vast store of useful information. Similarly, the attitude of being hopeful as portrayed in one of the classics, according to Ranganathan, must be adopted in providing reference service. In other words, the reference service must exhaust all

possible areas within and without the library to satisfy the information needs of the users.[58]

In conclusion, since the Sanskrit language formed the root of many Indian languages, Ranganathan published a glossary which gives the Sanskrit equivalents of library terms, in order that one can easily derive synonymous terms in other Indian languages.[59]

Fourth stage of study

The fourth stage of the study will develop a supported interpretation, based on what was observed in the writings of Ranganathan and of critics, as to what formed the theoretical base upon which the practical aspect of reference service was built.

Ranganathan's writings and in the writings of his critics with few exceptions, six factors were repeatedly stressed and formed the theoretical base upon which the practical reference service was developed: (1) the colon classification system; (2) the classified catalog and the symbiotic nature between them; (3) the five laws of library science that formed the foundation for reference work; (4) the emphasis of Ranganathan's experience with actual reference work; (5) Ranganathan's references to Indian Classical Literature; and (6) lastly, the principle of humanism applied in process of reference work. Each of these factors are dealt with in depth in the form of individual monographs and briefly discussed below. Ranganathan's classification system considered two important factors in defining the scheme. The two factors were the universe

of subjects and the psychology of readers that should be considered for the definition of a classification system. The scheme of classification used must "recognize the subject of the query, component ideas or isolates of the subject, determine the interrelationship among these isolates and arrange these isolates in a sequence preferred by the subject specialist."[60]

To retrieve documents relevant to the subject interest of the reader largely depends on the subject of the query being structured in the same way as the subjects of the document represented in the classification scheme and merging the two.[61]

One draws out the stages in the specification of the query:

1. Determine the basic subject of the query. For instance, the query is to find out details of 'Graphical solutions of simultaneous quadratic equations.' The basic subject is mathematics. It is further divided into 'higher algebra.'

2. Display part of the schedule of the scheme to select appropriate component isolates. Isolates are the fundmental units of knowledge. They are a sequence of terms arranged in successive subordination and cannot stand by themselves to form a subject. For instance, 'dispersion' denotes an isolate idea and meant to be a component of many subjects such as, Dipersion of Light; Dispersion of a Colloid. From the schedule, one picks out the isolate 'analysis/communication theory, under the sub-class 'higher algebra.'

3. At this point, the user could ask for the isolate

'simultaneous quadratic equations.' It is gotten by looking up the sub-class 'differential and integral equation' and the isolates: 'simultaneous and quadratic equations' is displayed. Further, turning to the sub-class 'differential and integral equation' the isolate 'graphical solution' is displayed. The user is satisfied with the search. The final facet analyzed subject of the query reads: simultaneous quadratic equations, graphical solutions. Further, the use of Ranganathan's classified catalogue also served to derive subject entries by the use of the chain indexing procedure. Both the classification scheme and the classified catalogue are mutually dependant on each other. This symbiotic nature helped to resolve conflicts that arise between them. Though the collection is well classified the patron finds it difficult to understand the artificial language of the classification system. Instead, according to Ranganathan, the classified catalog,

> is helpful if the classified arrangement of books on the shelves is paralleled by the library catalog.... directs the reader to look up the classified part of it for his topic of interest and related topics or the shelves themselves.[62]

Ranganathan's classification scheme is based in the way the mind of the patron perceives and expresses his need for information, and presents the structure of subjects in the document and its relationships to other categories of subjects.[63]

Next, Ranganathan considered his five laws of library science to serve as the foundation of library science, and reference service was derived from these laws as one of the implications.

D.J. Foskett, in his analysis of Ranganathan's work on reference service, concluded that Ranganathan always sought for the guiding principles by which one should act and these principles are his five laws.[64]

Ranganathan's laws could also be termed as number of hypotheses, which are derived by the process of induction. Inductive inference could be derived from observation of specific cases or they could be envisioned in the mind itself. The act of intuition reduces these empirical laws to a few fundamental laws. Then the process of deductive reasoning is used to work out all implications of the fundamental laws. In the last stage, these implications are tested against observed cases.[65]

Reference service emerged as one of the implications of the laws and it could be referred back to these laws if any kinds of conflicts come about in the theory and practice of reference service. Thus the five laws of Ranganathan serve as the basis on which library science is built.

Further, Ranganathan had used the parameters books and readers in the laws stated. However, these parameters could be changed to information and user to suit the altered situation. This flexibility conforms to one of the expectations of testing the effectiveness of the hypothesis.

Ranganathan also used case studies in formulating the principles of reference service. The practical experiences with reference work help to form a pattern of users with varied

backgrounds and different types of questions asked and also forms patterns of the different librarians adopting different strategies to answer them. Ranganathan, in his monograph publication titled Reference Service, presents over 100 case studies to support his concepts and theories, and to derive terms and concepts from them."

To illustrate, a subject specialist requesting definitions on 'rheology' will be guided to use the Concise Encyclopedia of Solid State Physics. This occurs because the user is a subject specialist and the term is part of the literature of Solid State Physics. However, a generalist user will be directed to consult a general source like the McGraw-Hill Encyclopedia of Science & Technology. Likewise, a specialist requiring information on 'neutrino' will be directed to consult a subject dictionary, Elseiever's Dictionary of Nuclear Science in six Languages or to a more basic or a general source.

The strategies adopted by various librarians could also vary. In other words, to locate a patent of a chemical compound, one could use either the key-word index of the Chemical Abstracts or identify its formula in the Merck Index and use the formula index of Chemical Abstracts to identify a patent. Further the query of the patron needs to be correctly understood in order to direct him to the appropriate source. One such query of the patron was to get information on baseball bats. However, on closer examination of the query with the patron revealed that the patron would like to have

information on the physical properties of the material, wood, that is used to make baseball bats and it preferences for its use over the use of steel baseball bats.

Foskett, Osborn, and Grogan confirm in their analysis of Ranganathan's theory of reference service that actual experiences of Ranganathan do enlighten the theoretical and practical aspects of reference service and also serve as a basis of the theory of reference service.

Further, many of Ranganathan's critics had termed his work on the theory of reference service as philosophical and considered that it served little of practical implication. Though Ranganathan was well versed with Indian Classical Literature and quotes effectively from them does not mean that his motive was to advance his religious beliefs and ideas.

One of Ranganathan's close associates described Ranganathan's spiritualism as emerging only when he had a lot of details to handle and to organize. Ranganathan's knowledge of the classics was used to gain the right perspective in the use of the terms, concepts, or reference service. Most of his theories were based on deep intuition, which his intellect strove to make scientific to the rational mind.[67]

Further, D.W. Langridge, principal lecturer, School of Librarianship, The Polytechnic of North London, mentions in one of his writings that Ranganathan's contributions are judged by two groups of people. The first group who are little informed on the

writings and thoughts of Ranganathan have found an explanation for the peculiarities and found an excuse to ignore him. The second group who are familiar with Ranganathan's writings and are not able to see the relationship of his concepts in context come to think the use of classical thoughts to elucidate a deeper meaning to the concepts and terms as an abnormal phenomenon and concentrate on the rational aspects of his works.[68]

Next, according to Langridge, Ranganathan's objective was to see librarianship as a whole and not as discrete packets of services that are unlinked to each other. Ranganathan in his first visit to England came to the conclusion from the visits to different libraries there that there are guiding principles from which library practices and new trends could be deduced.[69]

In examining whether Ranganathan's concepts have stood the test of the times, the question was answered by Vickery in his examination of Ranganathan's classification system that could be used for indexing purposes. Both Vickery and Lancaster, on examination of Ranganathan's colon classification system, found the concept 'facet analysis' used by Ranganathan potentially helpful in the contruction of any type of controlled vocabulary for inclusion in a thesaurus.

In other words the raw materials for facet analysis are the terms themselves derived from careful examination of the literature of the field (text books, encyclopedias, glossaries and abstracts). The characteristics chosen for organizing the terms are those that

actually give rise to the categories and that may be used to form facets. For instance, the word cohesion is defined as the property of particles sticking together to form an aggregate and which is assigned to the category of 'property' and used to form facets.

In the main class mathematics which is denoted by the symbol 'B' and further divided by facets and in successive subordination 'analysis/communication theory, foundation of analysis,... calculus, differential calculus, partial differential calculus, integral calculus, definite integral calculus, multiple integral calculus....

Lastly, according to Ranganathan, one asserts that no matter how well the collection is classified and analyzed by various manual and mechanical means, if any of them are not aided by the human element to translate the potential energy of these tools to kinetic energy, the aids in information retrieval developed are useless. It is the human factor that puts the library to use and no matter how interactive a system for reference service is built, the human element is irreplaceable. It is because humans come to the library and their needs and psychology are just like any other human beings and it is appropriate that human beings can satisfy them.[70]

In conclusion, the study of Ranganathan's theory of reference service has been worthwhile. It reveals a theory of reference service that is much more deep than perceived by his critics who claim it is superficial and of little practical value.

Ranganathan developed his theories to reference service keeping in mind the existing situations of his times and the needs of the user. At the same time, Ranganathan also focussed his mind on the future implications of his own reference theory. In this regard, F.W. Lancaster asserts that Ranganathan was aware of the changes in the environment and he refers to Ranganathan's work, Documentation: Genesis and development, to the concept of 'acceleration of exploitation of new ideas.'[71]

Ranganathan considers the fourth law of library science, which states 'Save the time of the reader,' as one principle that could be applied in the age of mechanized retrieval of information to save the time of the user with emphasis on researchers and subject specialists, and this would raise the status of the library profession. This view is also shared by Hansen in his evaluation of Ranganathan's reference work and he agrees with the importance placed on the principle: Save the time of the reader.[72]

Ranganathan further believed that changes will occur with access to information in libraries in the course of time andformulated the fifth law of library science, which states that 'library is a growing organism.' The changes that would be noticed are with regard to the increased number of publications in various formats, increases in the number of users and the staff. The staff may be subject specialists or may need additional training to access information in the technological age.[73]

Further, Ranganathan's five laws serve as guiding principles

to check any distortions of the use of information in the technological age. For instance, the advent of information technology has changed the policy of free services to users.[74] In other words, with information being centralized, there is a cost for purchasing, storing, organizing and retrieving information. In all, certain categories of people will benefit from it but at the expense of others. There are certain categories of users like students, poor residents in a public library, junior employees in a special library who are deprived of the benefits of library services, and people of developing countries who are unable to handle its costs. Such a service would serve only some categories of users but at the expense of others.

In determining whether Ranganathan's reference service was the foundation and the hub of all library work, a number of library specialists, in assessing Ranganathan's reference service, came to the conclusion that the "Five laws of library science" served as the foundation of library work and one of the implications of the laws was humanistic reference service which served as hub of all library practices.[75]

E.J. Coates in the paper, "Classification in Reference Service" notes the pattern of the varied subjects represented in the colon classification system to be similar and easier for reference librarians to recall all the facets of the subjects. In other words, taking the schedules of Animal husbandry, Medicine and Painting, the arrangement is such that it defines the subjects,

ennumerates its theoretical concepts, its operational methods, and finally its results and applications. However, this does not exempt the reference librarian for not having any knowledge on the subject but instead it helps the search with a minimum amount of information held by the reference librarian.

E.J. Coates paper, "Ranganathan's Thought and Its Significance for the Mechanization of Information Storage and Retrieval," describes the ideas presented in the colon classification system with an emphasis on 'facets' that has become a part of the literature on mechanization of information storage and retrieval.[76] In other words, the representations of various facets of the subject bring about syntactic relationships, wherein two concepts are not related in their definitions but concepts brought together from any part of the document. They may be inflections, or simple juxtaposition in a sentence or statement of subject. For instance, the query 'controlled conditions and nuclear reactions' will retrieve information of controlled conditions for nuclear reactions and information of those nuclear reactions that takes place under controlled conditions.

While in the case of semantic relationships, there is a relation between the concepts. For instance, the 'broad term' and the 'narrow term' relation in thesauri are semantic and this kind of relation is no longer the only kind of relation considered to retrieve information.

In contrast to the usefulness of the colon classification

system for information retrieval as explained in the earlier paragraphs of this paper, Shepherd in his evaluation of the colon system points out its limitations.[77]

To illustrate the point, the hypothesis on whether the colon classification system served as the foundation for automated analysis and for the retrieval of primary information from full text of documents was evaluated. The primary information is whether exact passages of the text, such as sentences or a paragraph can be retrieved to satisfy the patron's query. In conclusion, the colon system demonstrated a higher 'recall' but lower 'precision' than the Boolean systems. The colon system did not perform significantly better than other systems and was considered expensive to operate as it needed highly trained personnel for the construction and maintenance of the classification schedules. In all, a great deal of research will be required before colon classification can be considered as the foundation for the retrieval of primary information from the full text of documents.

Another futuristic implication of Ranganathan's theory of reference service, the concept of the classification system, led him to develop depth schedules for subjects in order to individualize and to retrieve the minutest detail of the subject for reference service.[78] In other words, because of the interdisciplinary nature of the subjects, it becomes essential for researchers to work jointly, and the depth schedules developed will

be able to provide information to the researcher in the area of his specialization.

To a large extent Ranganathan's use of concepts to build the theory reference service are found to be in accord with the American concept of reference service. William W. Bishop, one of the earliest reference theorists, defined what must constitute the theory of reference service. It must 'aid the user.' In other words the user has come to the library with a definite purpose and it is important for reference service to aid the purpose in any possible way. It includes answering directional queries, preparing extensive lists of references by the use of indexes and catalogs and so on. It is not the aim of reference service to conduct the study for the user but to aid it in any possible way. This view of Bishop relates to Ranganathan's study of the types of reference service namely, ready reference and long range reference service explained in the second stage of the study.

Next James Wyer believed that an accurate interpretation of reference service was 'to help' or 'assist' the reader to find the answers rather than the source of the answer and it even goes beyond one's collection to find the answers. This view of Wyer relates to Ranganathan's study of the preparation stage in carrying out long range reference service where it involves keeping in touch with information specialists, scientists in the field of specialization, and documentation centers both at the national and at the international level.

Further, Pierce Butler and William A. Katz looked to reference service in answering directional or ready reference queries, specific queries involving compiling sources on a topic and research type of queries where the enquiry is scholarly, requiring to location of sources outside one's collection. This again is in accord with Ranganathan's concept of reference service explained in the second stage of the study.

To provide reference service based on humanistic principles is best illustrated by Samuel Green. It is a relation where the librarian freely interacts with the reader where authoritarian and superiority attitudes and complexes are kept dormant and the willingness to listen and understand with interest and patience the user's needs are activated. This approach has led to serious studies of reference interviews in order to carry out efficient reference service. This view is in complete accord with Ranganathan's humanistic thoughts which have served as the basis for understanding the complex communication process in reference interviews.

In conclusion, the kind of interpersonal communications on a one-to-one basis viewed by Ranganathan is not only the means to further library public relations or to treat reference service as social etiquette of good manners or being polite towards the user but also to establish genuine human relationship with the user owing to the fact that the users are human and their psychology is no different from other human beings. In other words, in addition

to attending the users queries at the reference desk, the reference librarian, while moving around the reference section and enquiring with the users about the status of their searches or recommending alternatives, makes reference service most valued. This kind of humane service enhances the conviction of the users that the library serves as a useful and an important institution in society.

DEFINITIONS OF TERMS

ALIEN:

A subject totally irrelevant to the subject sought.

ANALYTICO-SYNTHETIC:

Classification which represents a subject by analyzing it into its fundamental constituent elements and synthesizing class symbols for the subject out of these elements linked by appropriate connective symbols.

APUPA ARRANGEMENT:

An arrangement in which subjects are in the sequence on the shelf. They are alien, penumbral, umbral, penumbral, alien.

BASIC SUBJECT:

Subject without any isolate idea as a component. For example, Chemistry considered as the basic subject as against Chemistry of gold.

CHAIN PROCEDURE:

Standardized procedure, where successive terms in a chain of classes are transformed into headings for an alphabetical index.

COMPOUND SUBJECT:

Subject with a basic subject and one or more isolate ideas as components.

DEDUCTIVE APPROACH:

The five laws which form the foundation of all library work contain in a latent form all the ramifications of reference service. Reference service has been deduced from these laws.

DEPTH CLASSIFICATION:

This scheme individualizes and retrieves the minutest detail of the subject. It also acts as a link in the chain of communication needed by subject specialists for continuous research, which produces new micro subjects.

DIVINE CURIOSITY:

It instills, in librarians and students of library science, the curiosity to find out the ultimate purpose of doing reference service.

DOCUMENTATION SERVICE:

A service which has it emphasis on nascent micro documents for the subject specialists and is highly valued in all research institutions.

FACET:

A generic term used to denote any component that may bè a basic subject or an isolate of a compound subject.

FACET ANALYSIS:

A systematic procedure for the precise, consistent structuring of subjects.

FIVE LAWS OF LIBRARY SCIENCE:

These laws are considered as the foundation of library science from which all library practices could be deduced and the parameters altered to the changed situations. They are: Books are for use; Every book its reader; Every reader his book and Library is a growing organism.

HUB:

The most important work among all library activities was considered as the center of the wheel with all other activities the spokes, which are interconnected and linked to the center.

LIBRAMETRY:

The application of statistical sciences and operations research methods to library procedures.

LONG-RANGE REFERENCE SERVICE:

It connotes a "long drawn out search" of information from monographs, periodicals, indexes and abstracts, and through inter library loan.

NOTATION:

It is a system of written symbols. They are symbolic representations of classes of knowledge and help to fix the position of any one class in relation to the others.

PENUMBRAL:

The subject which is partly relevant to the subject sought.

PRECISION

The proportion of retrieved documents that are relevant.

RECALL

The proportion of relevant documents that are retrieved.

SHELF STUDY:

The pattern of arrangement of books on the shelf. This is considered as one of the factors involved in the preparation stage for long range reference service.

UMBRAL:

The subject that is of primary interest to the user.

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